

BEER 2016 Abstract for Ecological Modeling Technical Session

Title: Social structure algorithms for a yellow-bellied marmot population model

Abstract: A long-term study (1976-2008) of a yellow-bellied marmot (*Marmota flaviventris*) population in the Upper East River Valley in Gunnison County, Colorado reveals a dramatic population increase from 2000 to 2008 when compared to the growth rate of the population over previous years. The increase has been attributed to changing climate conditions which have lead the marmot population to hibernate for shorter periods of time thereby allowing them more time to gain weight (and store fat) which has caused an increase in their likelihood to survive hibernation and their probability in successfully reproducing post-hibernation. We have modeled the yellow-bellied marmot population using an agent-based model (ABM) which accounts for population structure (matrilineal harems), movement between localities within a population, and the link between shorter winters and the rates of survival and reproduction. Here we present the relevant details of yellow-bellied marmot population biology and the development of an algorithm to simulate the dynamics of the population's social structure over time.